Juvenile Chinook Habitat Use in the Bear Creek Watershed

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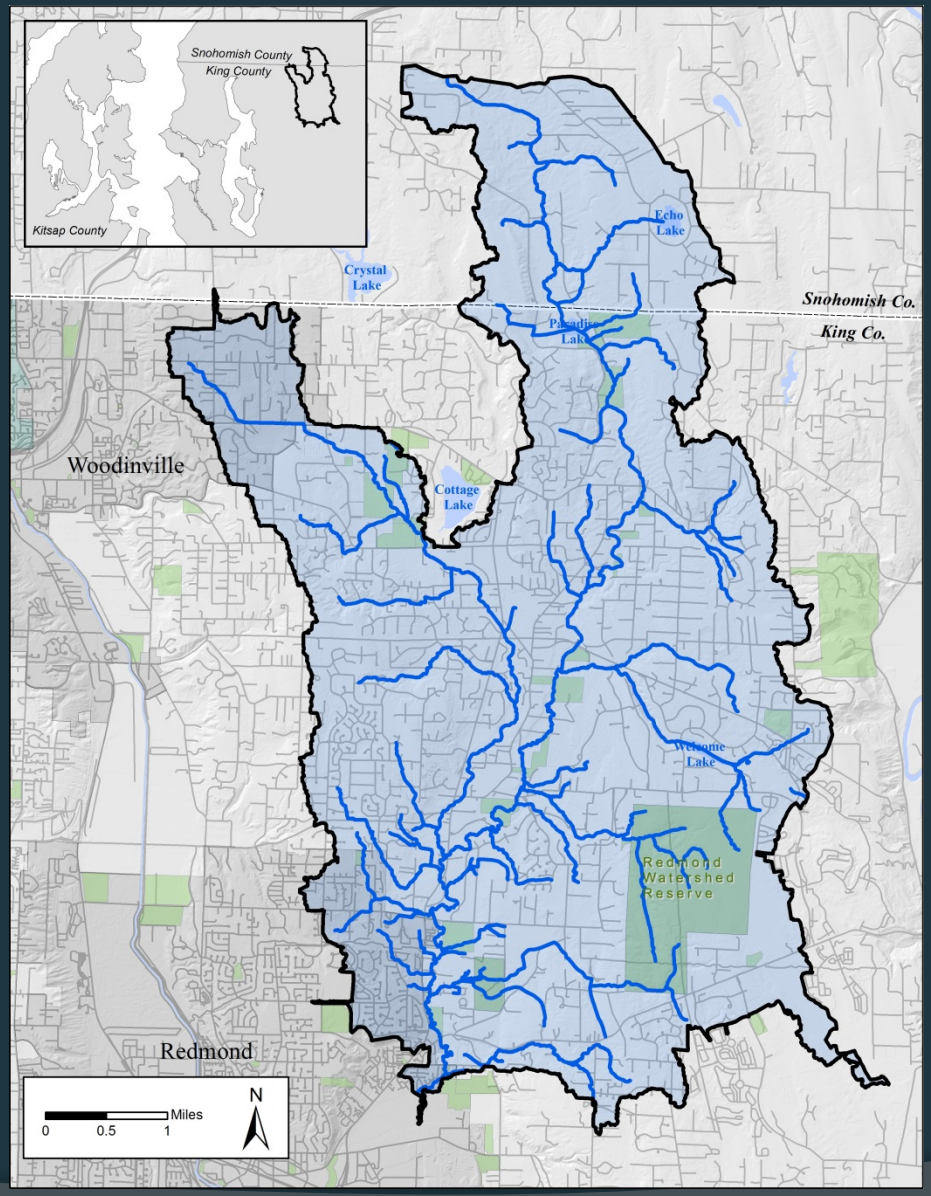
Bear Creek Watershed

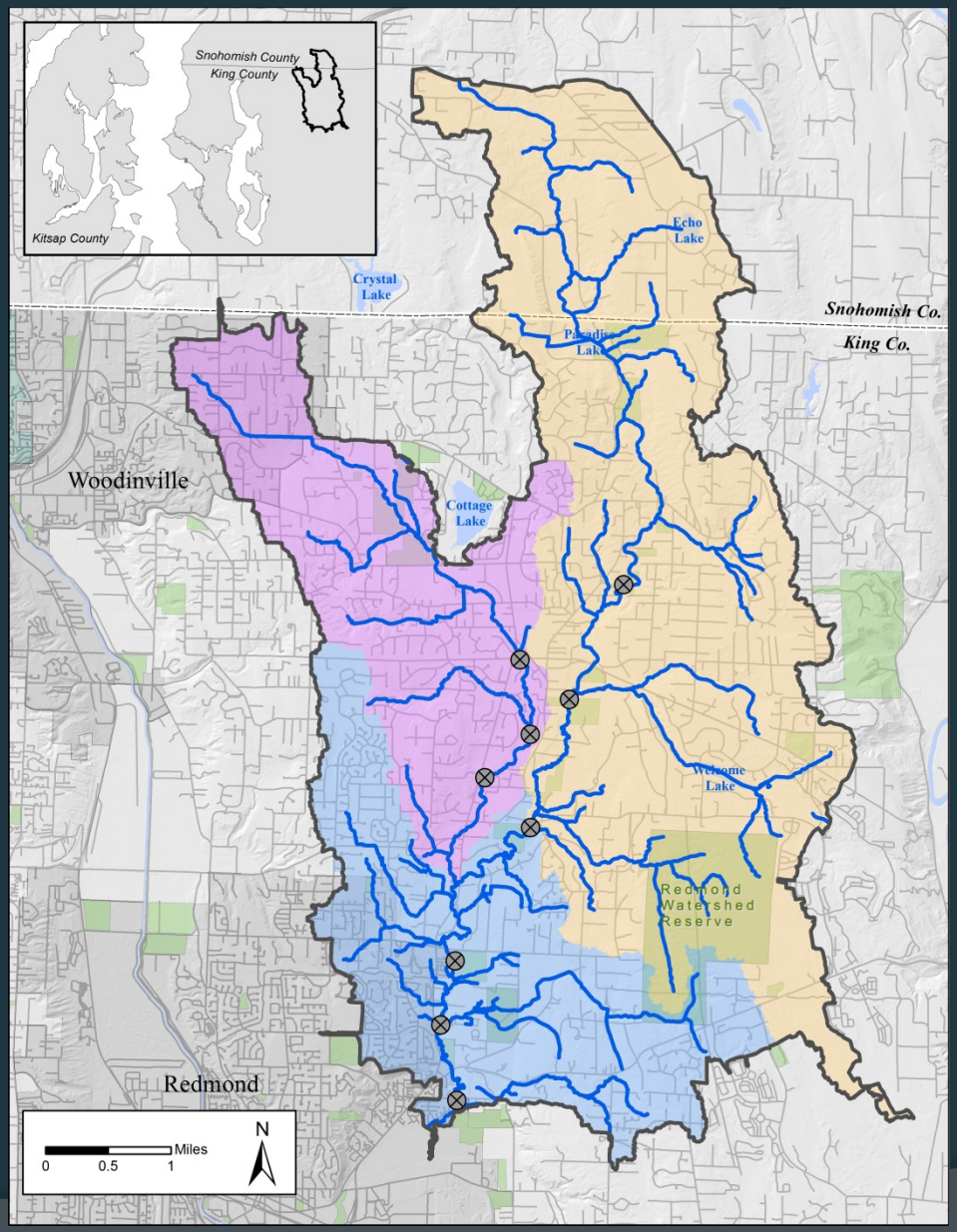


- 6 salmonid species
- Moderate-high quality habitats
- Bear Creek Watershed Stormwater Plan
- Habitat conditions and salmon use informs conservation strategies

Study Objectives

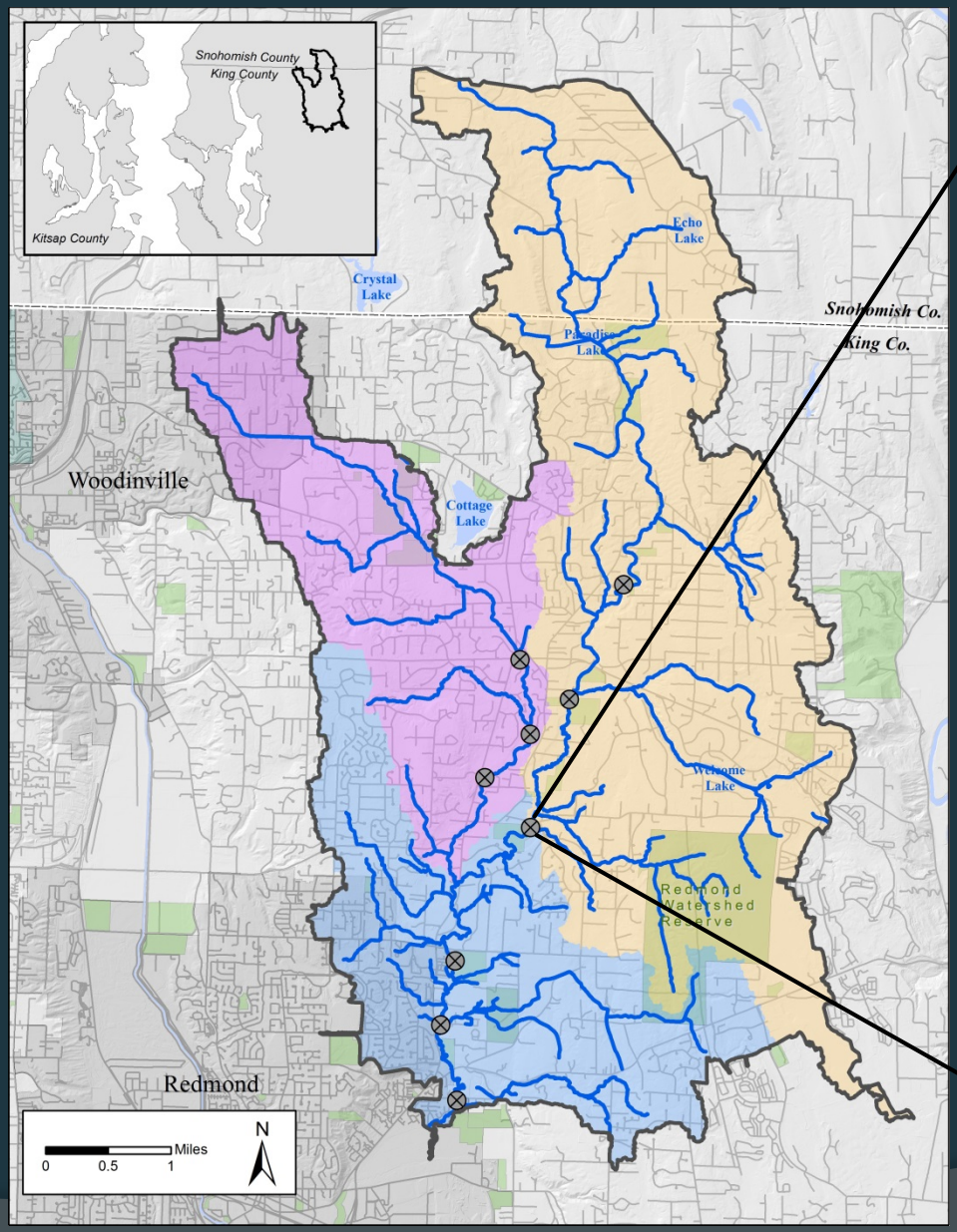
- Characterize and map instream habitat types
- Sample habitat types for juvenile Chinook
- Evaluate juvenile Chinook habitat use based on differences in relative abundance

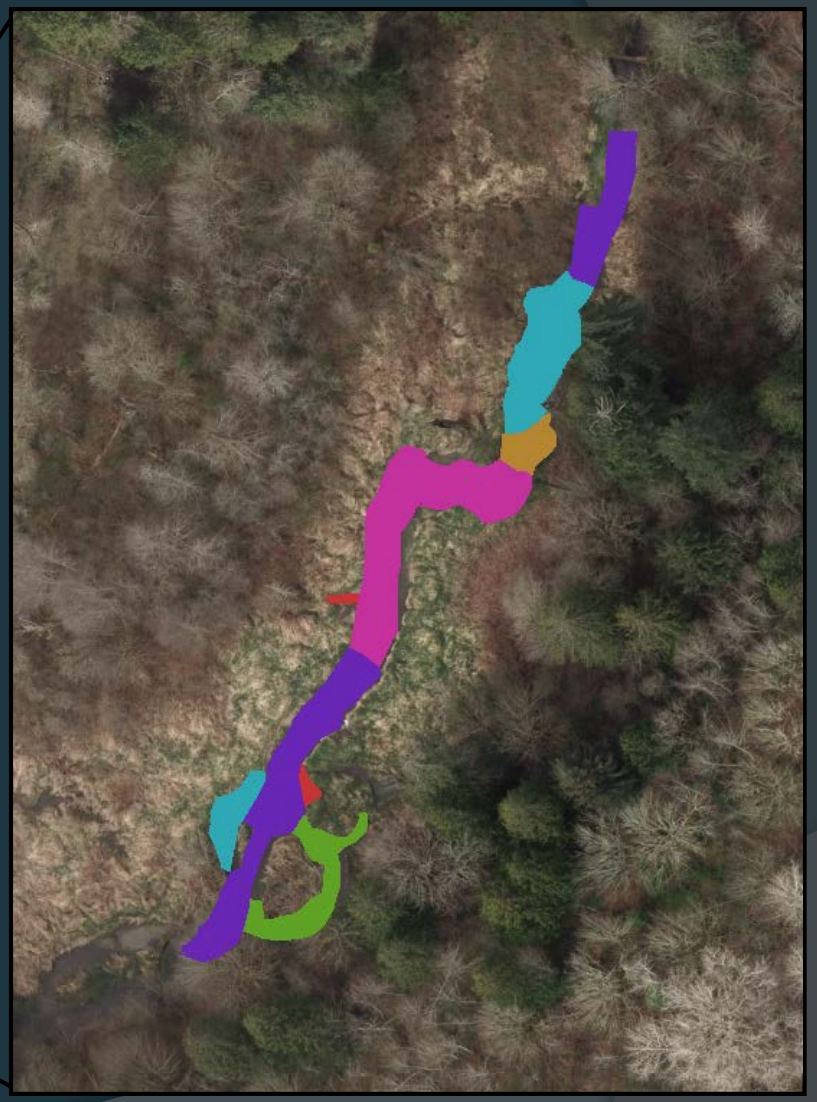
Sample Site Selection and Habitat Mapping



- Three sub-basin areas
  - Cottage
  - Upper Bear
  - Lower Bear
- Salmonid redd distribution
- Salmon watchers fish counts
- Landowner access
- Three sample sites per reach

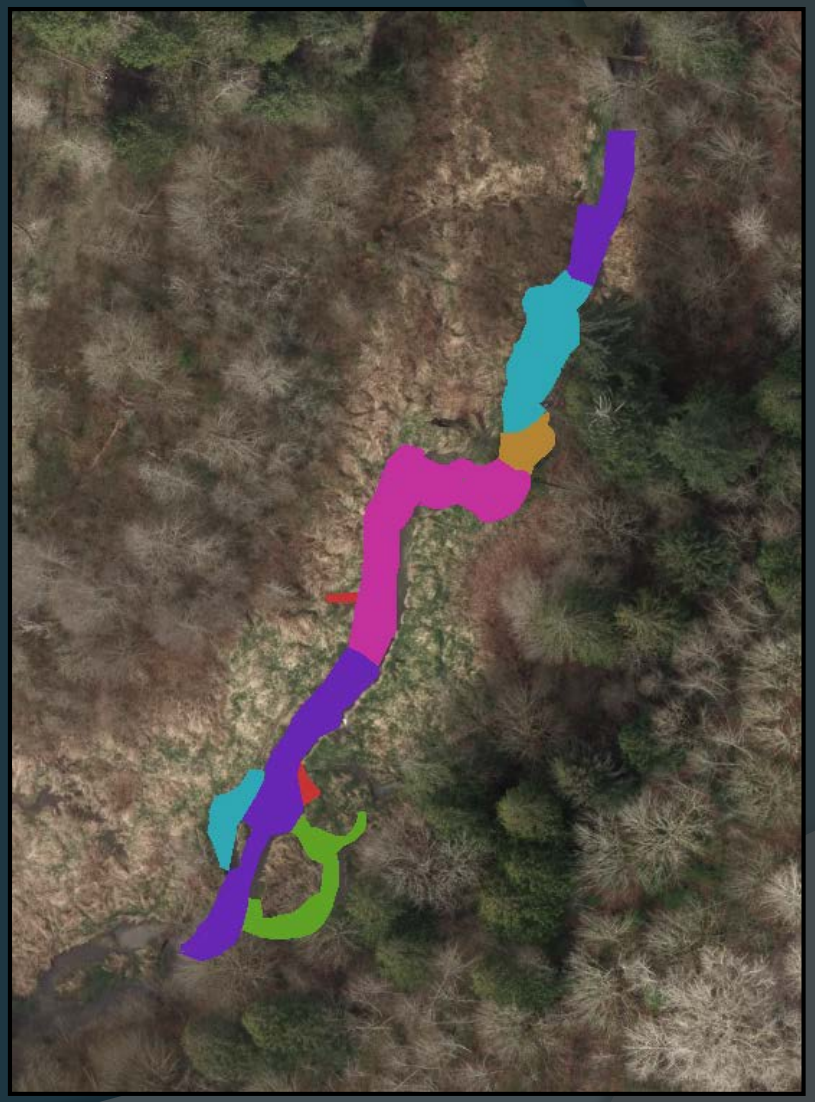
Sample Site Selection and Habitat Mapping





Sample Site Selection and Habitat Mapping

- Fast Water
  - Turbulent
    - Fall
    - Cascade
    - Rapid
    - Riffle
    - Chute
  - Non-turbulent
    - Glide
    - Run
- Slow Water
  - Scour Pool
    - Eddy
    - Trench
    - Mid-channel
    - Convergence
    - Lateral
  - Dammed Pool
    - Debris
    - Beaver
    - Landslide
    - Backwater
    - Abandoned channel
  - Side-channel
  - Tributary mouth

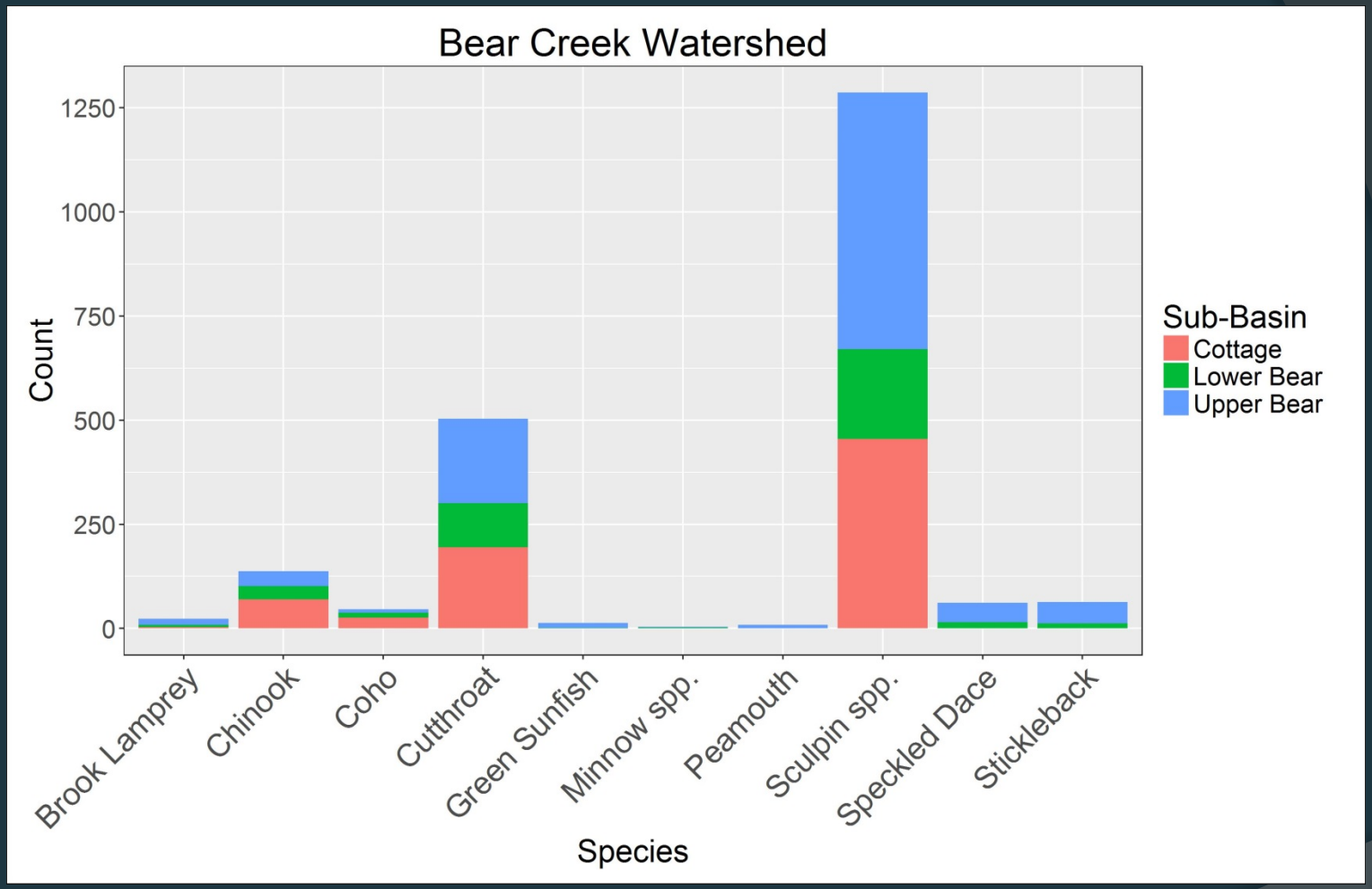


Modified from Hawkins et al. 1993

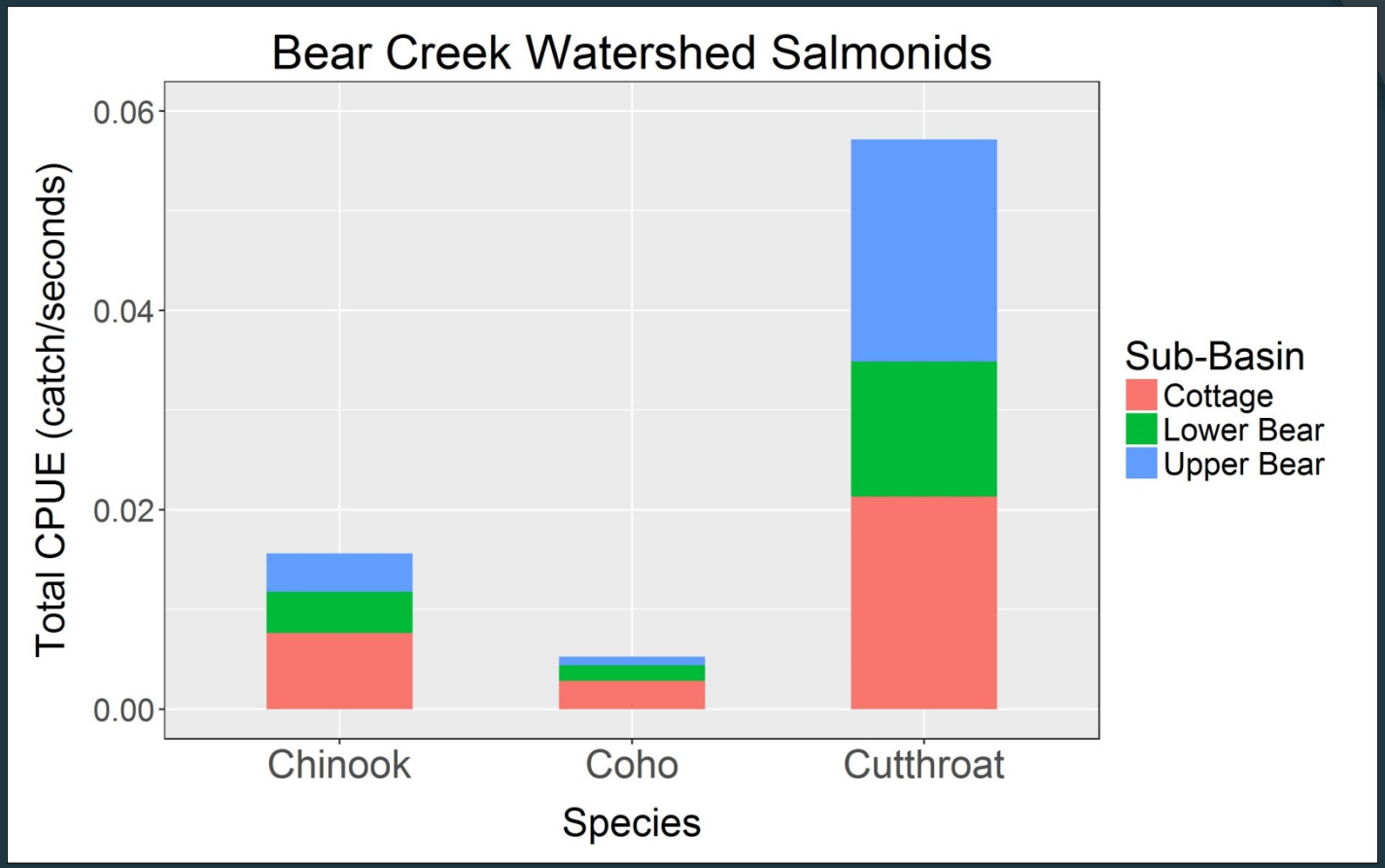
Habitat and Fish Sampling

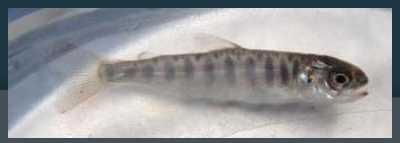
- Each habitat type was sampled within each sub-basin
- Habitats were sampled monthly from Feb – June, 2016
- Backpack electrofishing methods used to collect fish
- Collected species, length, and weight data

Catch by Sub-Basin



Salmonid Catch by Sub-Basin

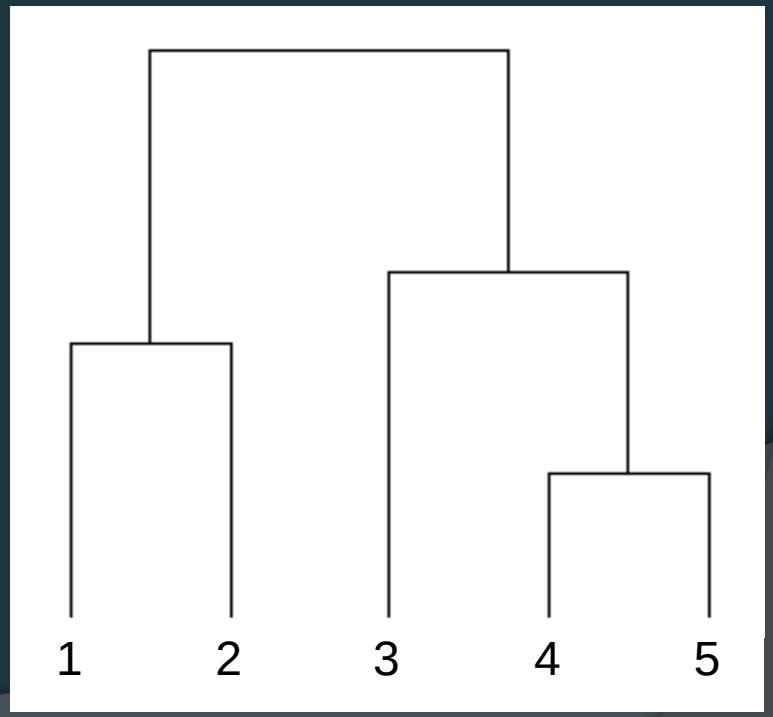




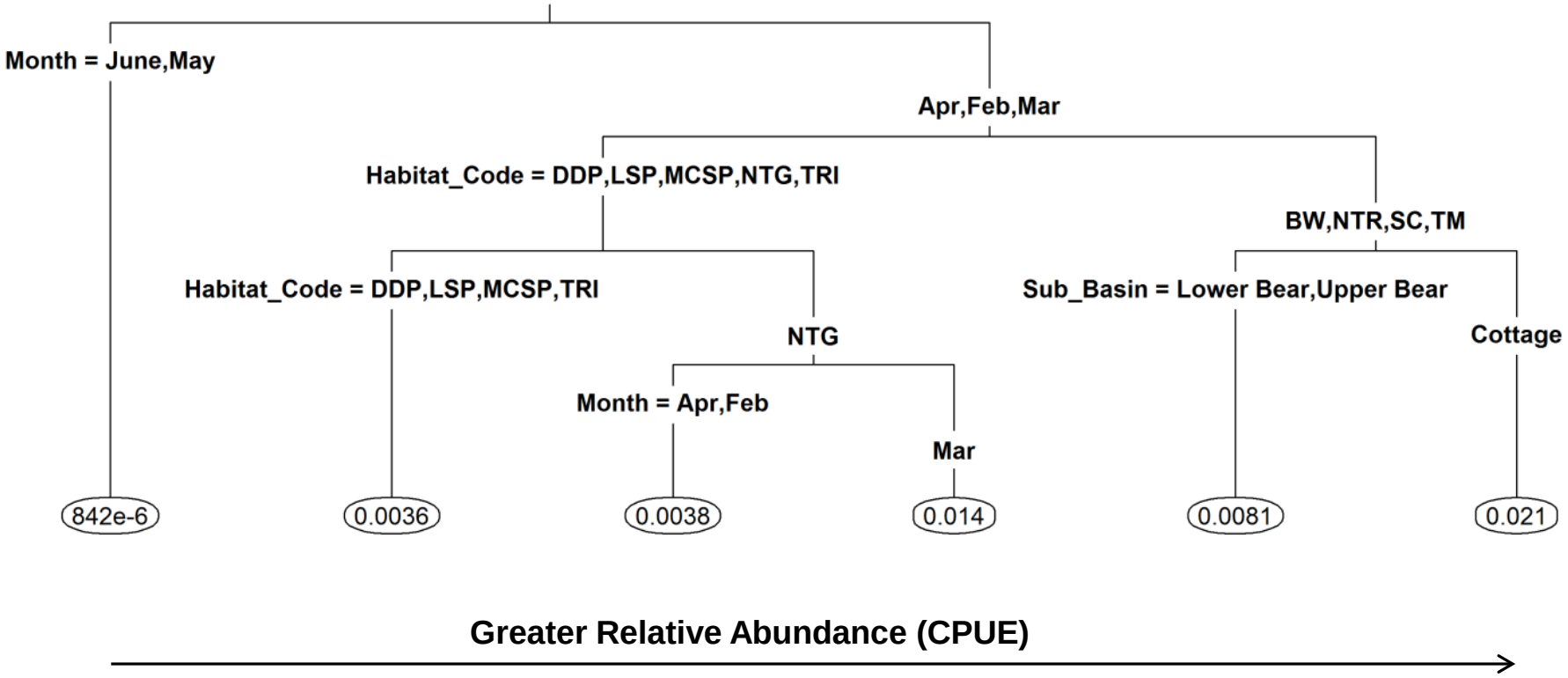
Juvenile Chinook Habitat Use

- Regression trees: recursive partitioning to separate a response variable into groups based on the values of explanatory variables
- Chinook CPUE ~ sub-basin + month + habitat type + fish cover

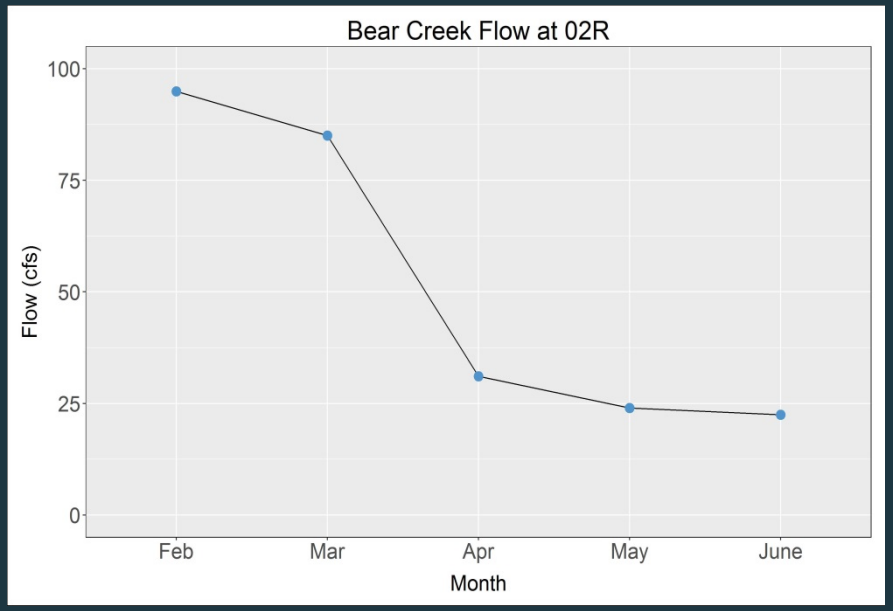
$$\text{CPUE} = \frac{\text{Catch}}{\text{Seconds Fished}}$$

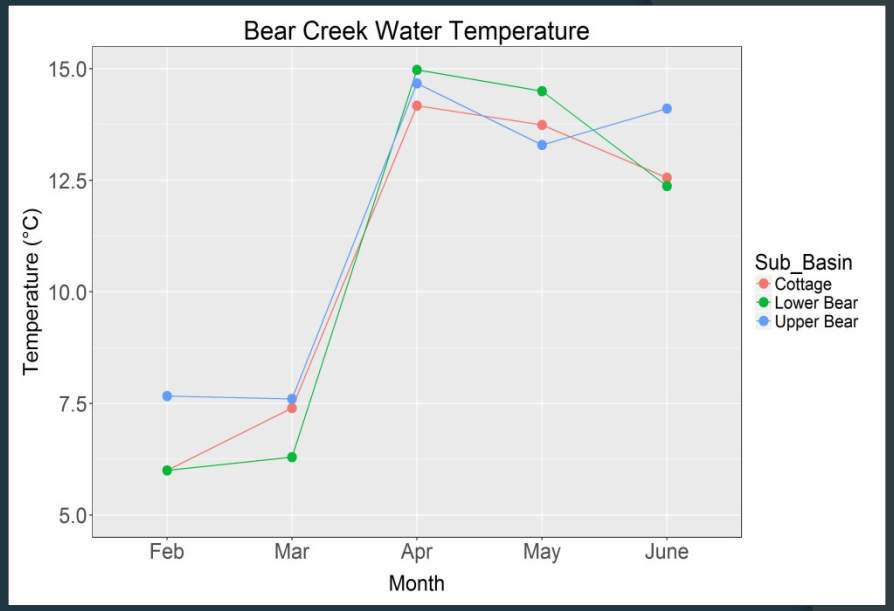


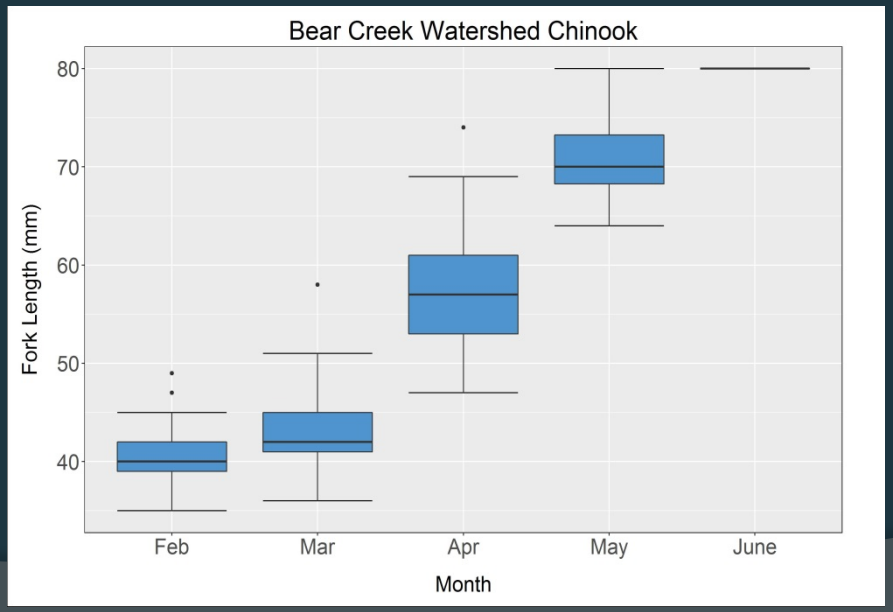
Juvenile Chinook Habitat Use



Juvenile Chinook Habitat Use



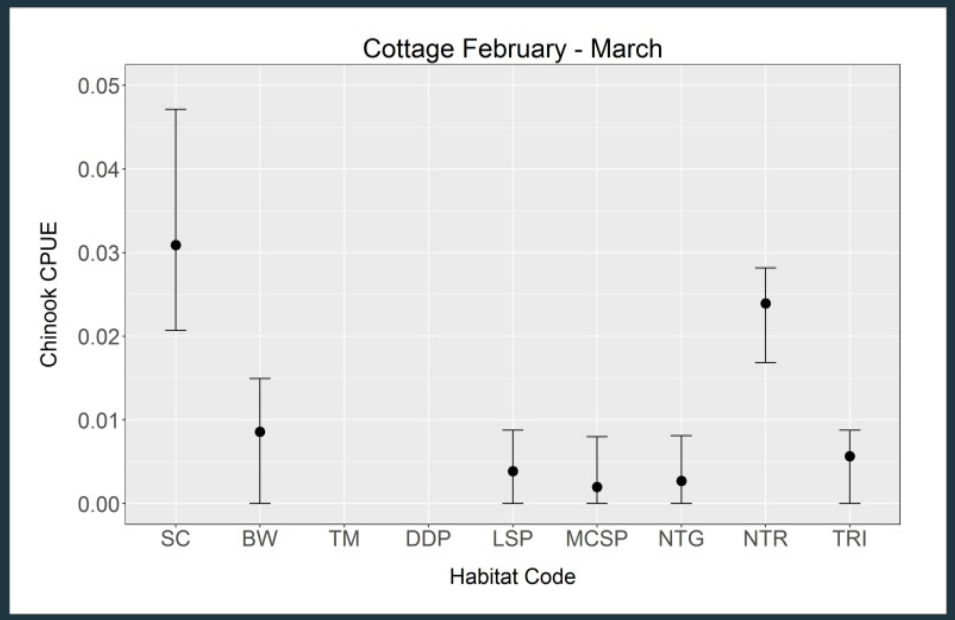


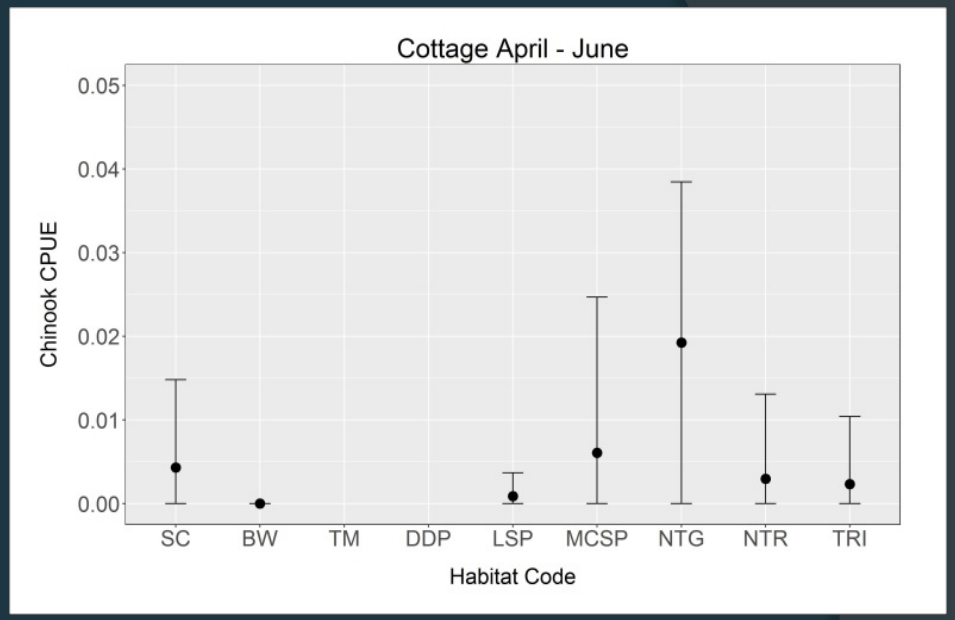


Bear Creek Chinook life stages

- Fry (small – leave early)
- Parr (larger – leave later)

Juvenile Chinook Cottage Habitat Use

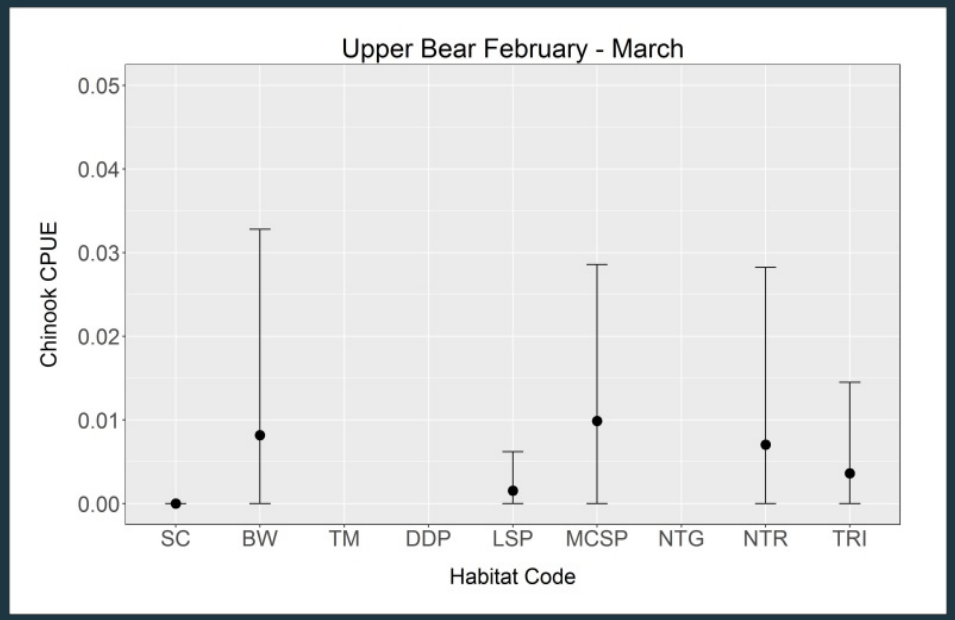


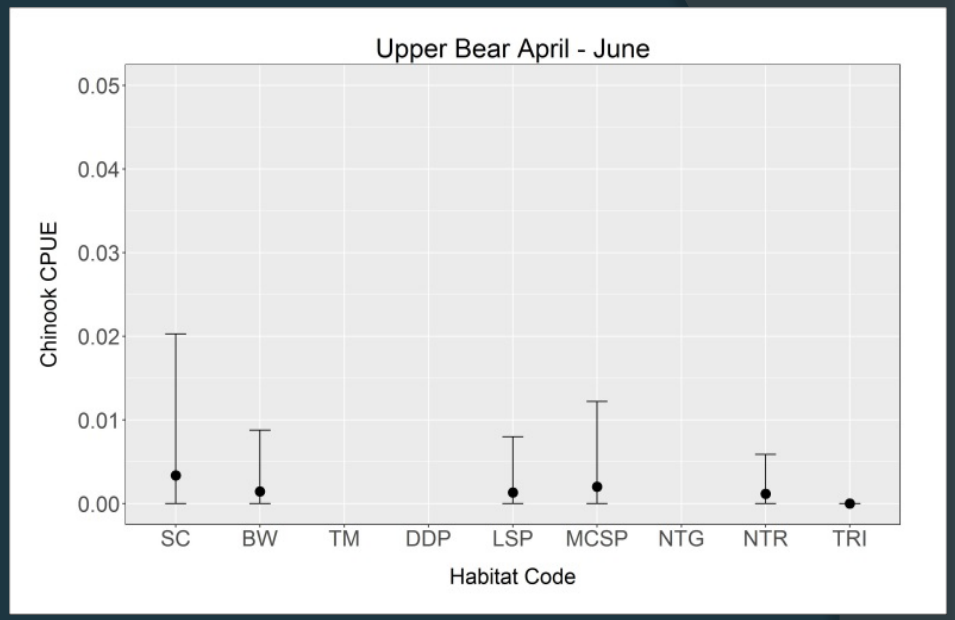


- Side-channel (SC)
- Non-turbulent run (NTR)
- Backwater (BW)

- Non-turbulent glide (NTG)
- Mid-channel scour pool (MCSP)
- Side-channel (SC)

Juvenile Chinook Upper Bear Habitat Use

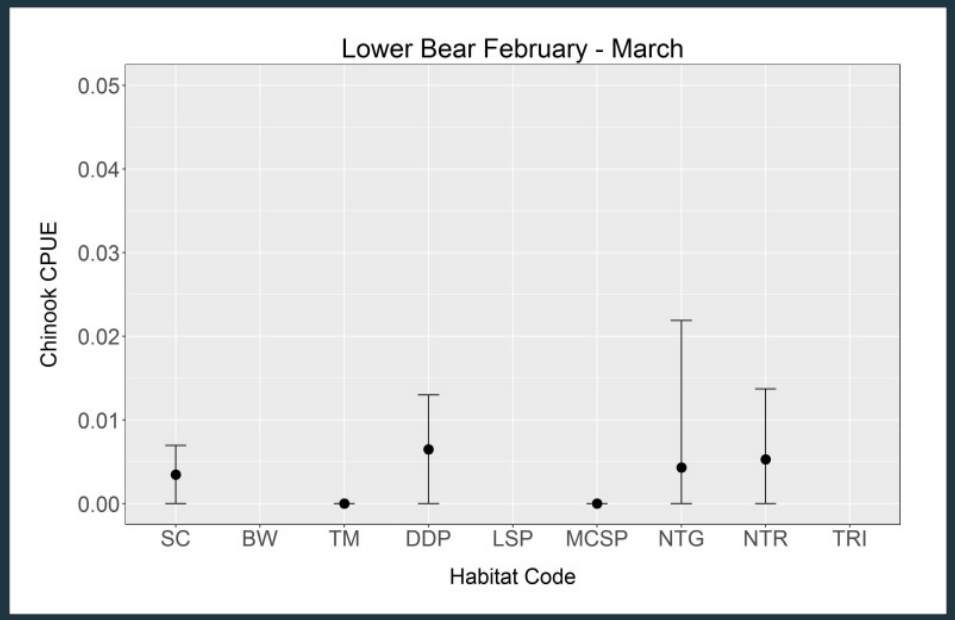


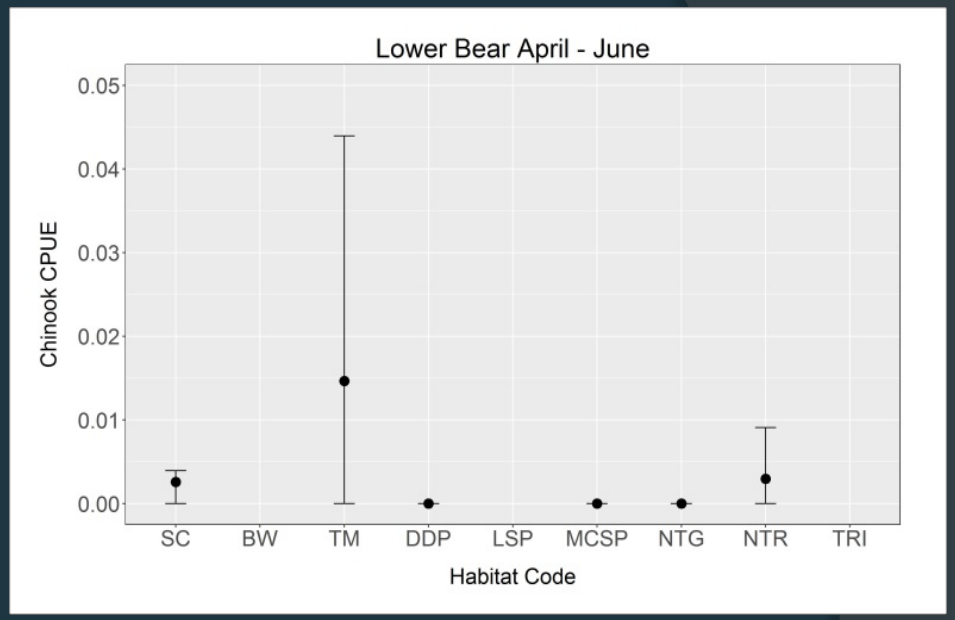


- Backwater (BW)
- Mid-channel scour pool (MCSP)
- Non-turbulent run (NTR)
- Turbulent riffle (TRI)

- Side-channel (SC)
- Mid-channel scour pool (MCSP)

Juvenile Chinook Lower Bear Habitat Use

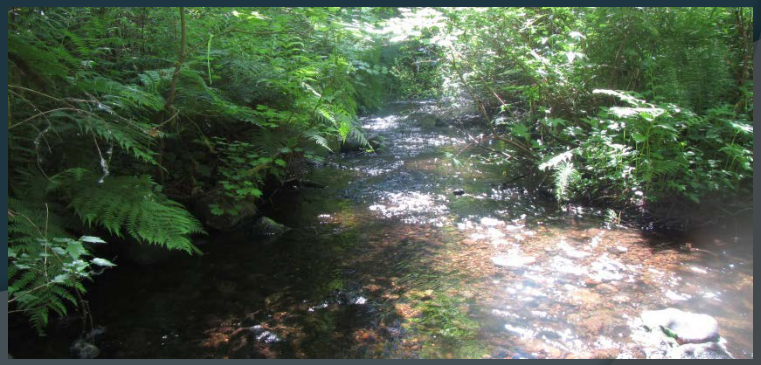




- Non-turbulent glide (NTG)
- Debris-dammed pool (DDP)
- Non-turbulent run (NTR)
- Side-channel (SC)
- Tributary mouth (TM)
- Non-turbulent run (NTR)

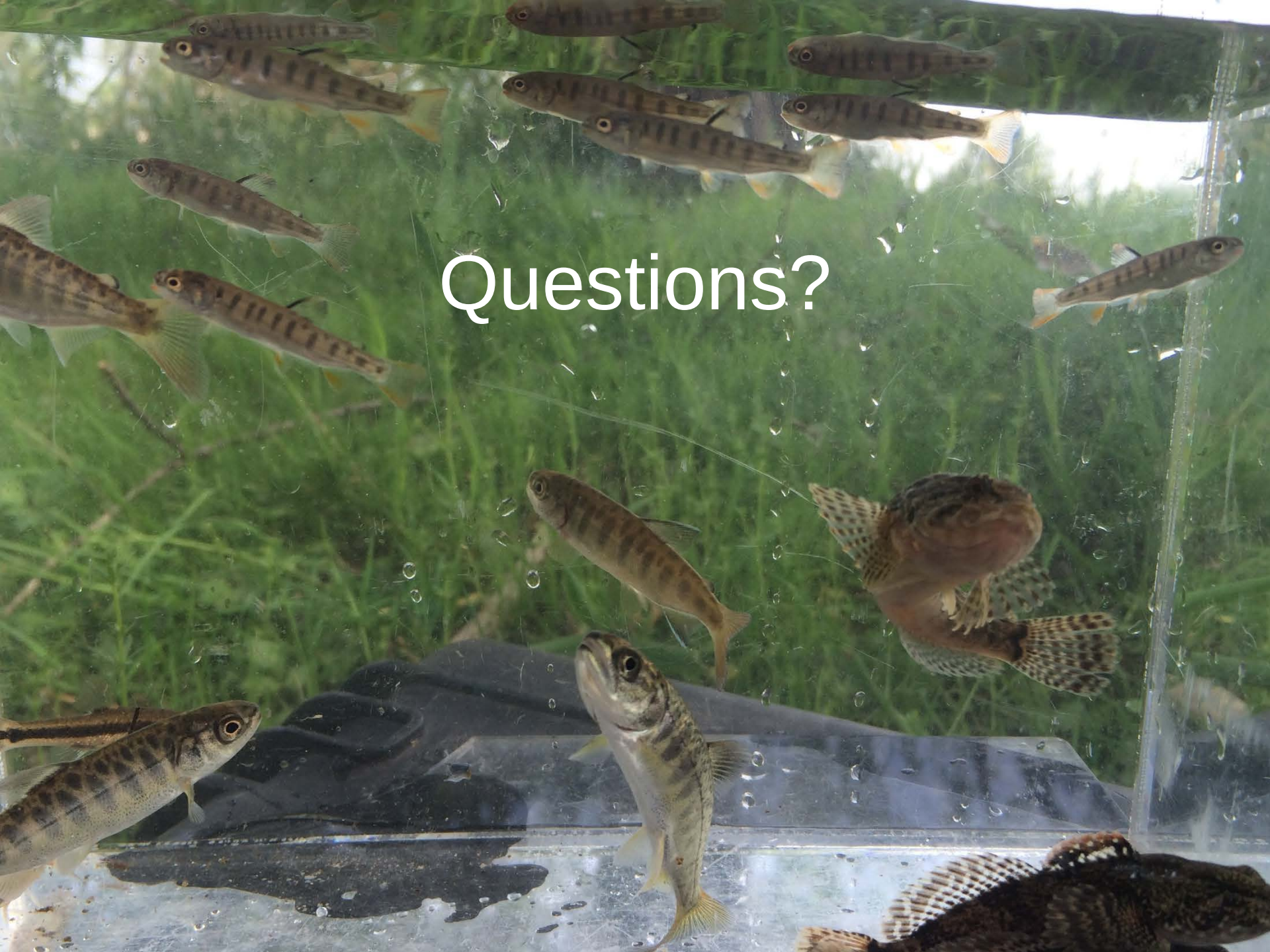
Juvenile Chinook Bear Creek Habitat Use

- A suite of habitat types support juvenile Chinook in the Bear Creek watershed; the suite varies across months and sub-basins
- Well-functioning riverine, floodplain, and riparian processes support a complete suite of habitat types
- Integrating existing habitat conditions with observed juvenile salmonid habitat use patterns can help to guide specific conservation strategies



Special Thanks

- Landowners in Bear Creek
- Chris Gregersen
- Dan Lantz
- Jim Bower
- Jeff Burkey
- Kate Macneale
- Curtis DeGasperi
- Steven Brady
- Andrew Miller


Questions?